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United States Department of Agriculture
Forest Service

FOREST PEST MANAGEMENT

Technology Update

Southern Region, USDA Forest Service, 1720 Peachtree Rd., N.W., Atlanta, Ga. 30367

Southern Pine Beetle Fact Sheet
Number 39

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Piedmont Risk - A System to Calculate the Risks and Hazards of Pine Stand to Possible Attack by the Southern Pine Beetle

Purpose

This fact sheet presents a mathematical model that can be used to determine the risk of natural stands to losses due from attacks by southern pine beetles (SPB) in the Piedmont region of the South.

Description

This system can be used to determine the need for cultural treatment. For example, you may wish to convert shortleaf pine stands to other species, harvest overmature stands, or thin younger stands to reduce stand density and improve tree vigor.

Information needed to determine potential loss from SPB infestation for individual stands can be obtained from plots within the stands or from your office records. Stand inventory records, published soil surveys, and topographic maps can be used in the office. When field plots are used, establish several points in each stand. At each point, determine the stand composition, pine basal area/acre, and slope percentage.

Risk, hazard, and potential loss values are calculated for each plot and then averaged for each stand. Stands are then ranked based on these average values.

Inputs

1. Forest type
2. Landform
3. Soil texture
4. Radial growth (optional)
5. Pine basal areas per acre
6. Local stumpage value for sawtimber and pulpwood.

Outputs

1. Likelihood of spot occurrence (risk)
2. Likelihood of spot spread (hazard)
3. Expected loss due to SPB attack

Accessibility

A. To estimate risk of spot occurrence, check the line with the combination of inputs from above:

Shortleaf pine (>50%)	Steep slope (>10%)	Clay soil (>28%)	Radial growth last 5 years (in.) 0	.1	.4	.6	.8	1.0	Risk* class	Risk* value
yes	yes	yes	H	H	H	H	H	H	H	3
yes	no	yes	H	H	H	H	H	M	H	3
no	yes	yes	H	H	H	H	M	M	H	3
yes	yes	no	H	H	H	M	M	L	M	2
no	no	yes	H	H	H	M	M	L	M	2
yes	no	no	H	M	M	L	L	L	L	1
no	yes	no	H	M	M	L	L	L	L	1
no	no	no	M	L	L	L	L	L	L	1

*Average excluding radial growth

Combine the information shown on outputs 1 and 2 above to obtain a qualitative rating for potential loss. Spot spread (hazard) is directly related to pine basal area per acre. This measure of stand density is used to estimate the hazard from spot spread once an infestation is established.

B. To estimate likelihood of spot spread (hazard):

Pine basal area (ft^2/acre)	Hazard Value	Hazard Class
>120	3	High
90 - 120	2	Moderate
<90	1	Low

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EXPERIMENT STATION

C. To determine potential loss and need for treatment: Loss value = Risk Value* + Hazard Value **

*From A above

**From B above

Loss value	Potential loss	Need for cultural treatment
6	very high	extreme
5	moderately high	high
4	moderate	moderate
3	moderately low	low
2	very low	extremely low

D. To estimate potential economic loss:

Product	dbh (in.)	Product value
pulpwood	<9	1
sawtimber	>9	2

Potential economic loss = loss value + product value

Loss value	Potential economic loss
7 - 8	high
5 - 6	moderate
3 - 4	low

This rating technique is available for use on Apple II and Apple II lookalikes. You may also send a blank diskette to Wesley A. Nettleton, Entomology, Forest Pest Management, USDA Forest Service, 2500 Shreveport Highway, Pineville, LA 71360. The return diskette will also include four other SPB programs: AR Hazard, Mississippi Hazard B, Mountain Risk, and Texas Hazard.

Additional Information

Questions regarding this model and its use may be addressed to: Dr. Roy L. Hedden, Professor, Department of Forestry, Clemson University, Clemson, SC 29631, Telephone: 803/656-3303.

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